IN THE CLAIMS:

1. (Previously Presented) An apparatus for determining the density of at least one fluid within a pipe, the apparatus comprising:

a first sound speed meter positioned at a first sensing region along the pipe which provides a first system effective sound speed signal;

a second sound speed meter positioned at a second sensing region along the pipe which provides a second system effective sound speed signal;

a signal processor, responsive to the first and the second system effective sound speed signals, which provides a density signal indicative of the density of the fluid within the pipe based on a calculation that includes the first and the second system effective sound speed signals, and

wherein the first sensing region has a first compliance and wherein the second sensing region has a second compliance and wherein the first and second compliances are different.

2. (Previously Presented) The apparatus of claim 1, wherein the first sensing region has a first cross sectional compliance and wherein the second sensing region has a second cross sectional compliance and wherein the cross sectional compliances are substantially different.

3. (Canceled)

4. (Previously Presented) The apparatus of claim 1, further comprising a concentric shell positioned around each of the first and the second sound speed meters thereby isolating the first and the second speed meters from an outside environment.

5. (Currently Amended) The apparatus of claim 1, wherein the first and the second sound speed meters ~~determine~~ respectively provide the first and second system effective sound speed ~~signal~~ signals from one-dimensional acoustic pressure waves traveling along the pipe.

6. (Previously Presented) The apparatus of claim 1, wherein at least one of the first and the second sound speed meters comprises a fiber optic based sound speed meter.

7. (Previously Presented) The apparatus of claim 2, wherein the first or the second sensing region of the pipe comprises a non-circular cross sectional geometry.

8. (Previously Presented) The apparatus of claim 7, wherein the non-circular cross sectional geometry comprises an oval shape.

9. (Previously Presented) The apparatus of claim 2, further comprising an input line positioned between the first and the second sensing regions to provide a substance into the fluid.

10. (Previously Presented) A method for measuring the density of a fluid within a pipe, the method comprising:

a) measuring a first effective system sound speed at a first sensing region with a first compliance along the pipe and providing a first effective system sound speed signal;

b) measuring a second effective system sound speed at a second sensing region with a second compliance different from the first compliance along the pipe and providing a second effective system sound speed signal; and

c) calculating the density using the first and the second effective system sound speed signals.

11. (Previously Presented) The method of claim 10, wherein the calculating step (c) comprises:

d) subtracting the first and the second effective system sound speed signals to obtain a difference related to a compliance difference between the first and second sensing regions.

12. (Previously Presented) The method of claim 10, wherein the measuring steps (a) and (b) comprise measuring a propagation velocity of a one-dimensional acoustic pressure wave traveling through the fluid.

13. (Currently Amended) The method of claim 10, wherein the ~~step of~~ measuring steps (a) and (b) ~~the first and the second effective system sound speeds comprises~~ comprise measuring a strain of the pipe.

14. (Previously Presented) The apparatus of claim 1, further comprising a tube positioned along either the first sensing region or the second sensing region and within a flow path of the fluid within the pipe.

15. (Currently Amended) An apparatus for determining the density of at least one fluid within a pipe, the apparatus comprising:

a first meter positioned at a first sensing region along the pipe;

a second meter positioned at a second sensing region along the pipe;

a signal processor, responsive to signals from the first and the second meters, which provides a density signal indicative of the density of the fluid within the pipe based on a calculation that includes the signals from both the first and second ~~meter~~ meters; and

wherein the first sensing region has a first compliance and wherein the second sensing region has a second compliance and wherein the first and second compliances are different.

16. (Currently Amended) The apparatus of claim 15, wherein the first sensing region has a first cross sectional compliance and wherein the second sensing region has a second cross sectional compliance and wherein the cross sectional compliances are substantially different.

17. (Currently Amended) The apparatus of claim 15, wherein the first and the second meters ~~determine~~ respectively provide [[a]] first and second system effective

sound speed signals from one-dimensional acoustic pressure waves traveling along the pipe.

18. (Previously Presented) The apparatus of claim 15, wherein the at least one of the first and the second meters comprises a fiber optic based sound speed meter.

19. (Previously Presented) The apparatus of claim 15, wherein the first or the second sensing region of the pipe comprises a non-circular cross sectional geometry.

20. (Previously Presented) The apparatus of claim 15, further comprising an input line positioned between the first and the second sensing regions to provide a substance into the fluid.

21. (Previously Presented) The apparatus of claim 15, further comprising a tube positioned along either the first sensing region or the second sensing region and within a flow path of the fluid within the pipe.

22. (Previously Presented) A method for measuring the density of a fluid within a pipe, the method comprising:

a) measuring a first parameter at a first sensing region with a first compliance along the pipe;

b) measuring a second parameter at a second sensing region with a second compliance different from the first compliance along the pipe; and

c) calculating the density of the fluid using the first and the second parameters.

23. (Currently Amended) The method of claim 22, wherein the calculating step (c) comprises:

d) subtracting [[a]] first and [[a]] second effective system sound speed signals to obtain a difference related to a compliance difference between the first and second sensing regions.

24. (Previously Presented) The method of claim 22, wherein the measuring steps (a) and (b) comprise measuring a propagation velocity of a one-dimensional acoustic pressure wave traveling through the fluid.

25. (Currently Amended) The method of claim 22, wherein the measuring ~~step~~ steps (a) and (b) comprise measuring a strain of the pipe.